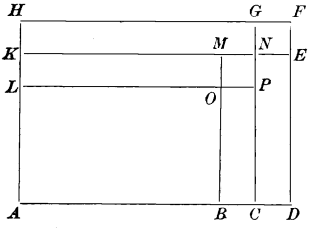
of the generated content ABC will be $aBC+bAC+$ cAB; and the moments of the generated powers A^2, A^3, A^4, $A^{\frac{1}{2}}$, $A^{\frac{2}{3}}$, $A^{\frac{1}{3}}$, $A^{\frac{2}{3}}$, A^{-1}, A^{-2}, $A^{-\frac{1}{2}}$, will be $2aA$, $3aA^2$, $4aA^3$, $\frac{1}{2}aA^{-\frac{1}{2}}$, $\frac{3}{2}aA^{\frac{1}{2}}$, $\frac{1}{3}aA^{-\frac{2}{3}}$, $\frac{2}{3}aA^{-\frac{1}{3}}$, $-aA^{-2}$, $-2aA^{-3}$, $-\frac{1}{2}aA^{-\frac{3}{2}}$ respectively; and in general, that the moment of any power A^m, will be $\frac{n}{m}aA^{\frac{n-m}{m}}$. Also, that the moment of the generated quantity A^2B will be $2aAB+bA^2$; the moment of the generated quantity $A^3B^4C^2$ will be $3aA^2B^4C^2+4bA^3B^3C^2+2cA^3B^4C$; and so on."

We shall now illustrate Newton's method by the notation in common use:



Let it be required to find the increment of the rectangle ACNK. Let AC$=x$; CN$=y$; BC$=-\frac{1}{2}dx$; CD$=+\frac{1}{2}dx$; MO$=$NP$=-\frac{1}{2}dy$; NG$=$EF$=+\frac{1}{2}dy$. Now, let xy represent the value of the rectangle when it has reached ACNK. First, giving to x and y the increments $+\frac{1}{2}dx$ and $+\frac{1}{2}dy$, respectively, and *then* the decrements $-\frac{1}{2}dx$ and $-\frac{1}{2}dy$, we shall have:

(a). $(x+\frac{1}{2}dx)\,(y+\frac{1}{2}dy)=xy+\frac{1}{2}ydx+\frac{1}{2}xdy+dx.dy.$

(b). $(x-\frac{1}{2}dx)\,(y-\frac{1}{2}dy)=xy-\frac{1}{2}ydx-\frac{1}{2}xdy+dx.dy.$

Subtract (b) from (a), and there will remain the absolute increase of the rectangle, *i. e.*, $ydx+xdy$. In a similar manner, it can be easily shown that the increment of the volume xyz is $xy.dz+xz.dy+yz.dx$. Newton's method, therefore, is vastly superior to the others, in that it disposes of $dx.dy$, $dx.dz$, $dy\,dz$, $dx.dy.dz$, dx^2, dy^2, etc., by a mathematical demonstration that is rigorously exact. That is to say, when those higher differentials are used in connection with differentials of the first order.

AN ELECTRICAL HYGROMETER.

[*Abstract.*]

BY LUCIEN I. BLAKE, LAWRENCE.

An hygroscopic substance, as chloride of zinc, is made the electrolyte in a galvanic cell. Variations in the amount of moisture in the atmosphere will alter the amount of this electrolyte and consequently the internal resistance of this cell. The cell itself is conveniently made by a strip of zinc and one of copper bridged by a piece of filter paper soaked in $ZuCl_2$. By connecting the poles through a sensitive galvanometer the deflections may be used as an indication of the amount of moisture present in the air. After five hours the polarization is about 20 per cent., hence it is practically *nil* during the time of an observation. Comparisons have been made for about a week with a Regnault's hygrometer. While the deflections followed the Regnault's with regularity, as yet the law connecting the amount of moisture and the deflections of the galvanometer has not been fully established. It is believed the instrument may be employed for a simple, inexpensive, and fairly accurate method of hygrometric observations.

FACIAL EXPRESSION AND ITS PSYCHOLOGY.

BY A. H. THOMPSON, TOPEKA, KANSAS.

The human face is said to be the mirror of the soul, because it reflects not only the static intelligence and refinement of the mind, but also betrays its transient emotions and passing impulses. The face is the servant of the emotions. It mir-